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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Ravi B. Gopal

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EXAMINER

BERHANU, SAMUEL

ART UNIT

PAPER NUMBER

2838

DATE MAILED: 01/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/771,152	GOPAL, RAVI B.	
	Examiner	Art Unit	
	Samuel Berhanu	2838	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 November 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 15-26 is/are pending in the application.
- 4a) Of the above claim(s) 14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 15-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 November 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

The petition for correction of inventorship filed 11/17/2005 under 37 C.F.R.

1.48(a) is hereby granted since the requirements thereof have been met.

Drawings

The drawings were received on 10/11/2005. These drawings are acceptable.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. Claims 1-5, 7, 15-22 and 26 are rejected under 35 U.S.C. 102(e) as being anticipated by Freeman et al. (US 6,519,539)

The applied reference has a common Assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding Claims 1 and 17, Freeman et al. disclose in Figure 1, an electrochemical system comprising a plurality of cells (90, Column 5, lines 31-

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32); a measuring device (120,130) including a plurality of inputs connected across the plurality of cells to generate voltage and current signals indicative of voltage and current characteristics of the plurality of cells (Column 5, lines 52-56); a current supply/draw means (80,100) for superimposing modulated current values through the plurality of cells (Column 5, lines 47-51) and, a controller (50) for controlling at least one system operating condition based on the voltage and current characteristics received from the measuring device, the controller being connected to the measuring device (Column 5, lines 45-47), wherein the at least one system operation condition comprises at least one of temperature, humidity, and reactant flow rates, within the electrochemical system (Column 6, lines 61-65).

Regarding Claim 2, Freeman et al. disclose in Figure 1, the current supply/draw means comprises a modulator (50, Column 5, lines 52-56).

Regarding Claim 3, Freeman et al. disclose, the modulator is an integral part of the controller (Column 5, lines 52-56).

Regarding Claim 4, Freeman et al. disclose in Figures 1, the plurality of inputs are connected across individual cells in the plurality of cells and the modulator is operable to superimpose modulated current values through the individual cells (Column 5, lines 40-56).

Regarding Claim 5, Freeman et al. disclose in Figure 1, the controller is operable to control, in real time, the at least one system operating condition based on the voltage and current characteristics received from the measuring device (Column 6, lines 46-56))

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Regarding Claims 7 and 19, Freeman et al. disclose the modulator is arranged to superimpose the modulated current values in burst time periods for high frequency resistance measurement, with time periods between burst time periods of no superimposition of modulated current values (Column 6, lines 1-33).

Regarding Claim 15, Freeman et al. disclose in Figure 1, wherein the controller includes an input (60), connectable to a computing device (20) for supply of control signals for controlling the controller.

Regarding Claims 16 and 22, Freeman et al. disclose in Figure 1, a load (100) powered by the plurality of cells (Column 5, line 36-37, implies a load draw a desire current), wherein the load is connected to the plurality of cells in parallel with the current supply/draw means. (Element 90, 100 and 110 has the same connection as the applicants Figure 2b)

Regarding Claim 20, Freeman et al. disclose wherein step (a) comprises controlling the superimposing to provide a series of set interference conditions, and measuring, for each interference condition, at least some of the voltage and current characteristics of the electrochemical device (Column 6, lines 46-65).

Regarding Claim 21, Freeman et al. disclose, a method wherein step (a) comprises varying a frequency of the superimposed current values; step (b) comprises generating the voltage and current signals at selected frequencies for the superimposed modulated current values, and determining from the voltage and current signals a plurality of real and imaginary components of the

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impedance of the individual cells; and, step (c) comprises controlling the at least one system operating condition based on the plurality of real and imaginary components of the impedance of the individual cells (Column 3, lines 57-67, Column 4, lines 1-39)

Regarding Claim 18, Freeman et al. disclose a method (a) comprises superimposing the modulated current values across individual cells in the plurality of cells; and step (b) comprises drawing current from the individual cells to generate voltage and current signals indicative of voltage and current characteristics of the individual cells (Column 2, lines 31-56)

Regarding Claim 26, driving a load using current drawn from the plurality of cells (Column 5, line 36-37, implies a load draw a desire current)

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Freeman et al. in view of Dunn et al (US 6,239,579).

Regarding Claim 6, Freeman et al. disclose all claim limitation, except the controller is operable to alert an operator based on alarm conditions determined from the voltage and current characteristics received from the measuring device. However, Dunn et al. disclose a controller is operable to alert an

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operator based on alarm conditions determined from the voltage and current characteristics received from the measuring device (Column 7, lines 18). It would have been obvious to a person having ordinary skill in the art at the time of the invention to modify Freeman et al device and add a monitoring circuit as taught by Dunn et al. in order to effectively monitor battery status.

5. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freeman et al. in view of Stader et al. (US 4,916,734).

Regarding Claim 8, Freeman et al. disclose in Figure 1, the measuring device provides a plurality of primary channels (120,130) for the measured voltage (120) and current signals (130), there being one channel for the voltage across each cell. However, Freeman et al. do not disclose the measuring device includes a splitter for separating out at least the DC components of the voltages across the individual cells from the primary channels, the splitter having first channels as outputs for the DC components Stader et al. disclose in Figures 1 and 2, the measuring device includes a splitter for separating out at least the DC components of the voltages across the individual cells from the primary channels, the splitter having first channels as outputs for the DC (Column 2, lines 19-68). It would have been obvious to a person having ordinary skill in the art at the time of the invention to add an AC and DC current separating means circuit as taught by Stader et al. in order to measure only the desired signal of interest.

Regarding Claim 9, Freeman et al. disclose in Figure 1, wherein the

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splitter includes second channels (130) as outputs for the AC components of the voltages across the individual cells.

6. Claims 10-13 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freeman et al. and Stader et al as applied to claim 8 above, and further in view of Bisher (US 5,416,416).

Regarding Claims 10 and 23, Freeman et al. and Stader et al. disclose the claim invention, except an analog multiplexer connected to at least the first channels from the channel splitter, wherein a multiplexer control line is connected between the controller and the analog multiplexer for controlling the analog multiplexer to switch sequentially between at least the first channels. However, Bisher discloses in Figure 9 an analog multiplexer (357) connected to at least the first channels from the channel splitter, wherein a multiplexer control line is connected between the controller and the analog multiplexer for controlling the analog multiplexer to switch sequentially between at least the first channels. It would have been obvious to a person having ordinary skill in the art at the time of the invention to add a multiplexer in Freeman et al. device as taught by Bisher in order to obtain the desired signal of interest.

Regarding Claim 11, Freeman et al. disclose, a first analog to digital converter (70) connected to the output of the analog multiplexer, a voltage data bus (60, ch1) connected between the first analog to digital converter and the controller and an analog to digital control line connected between the controller and the first analog to digital converter for control thereof (Column 5, lines 57-67)

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Regarding Claim 12, Freeman et al. disclose, a current sensing device (110) is provided connected in series with the individual cells for measuring the current, wherein the current sensing device is connected to the controller (130).

Regarding Claim 13. Freeman et al. disclose, the current sensing device (110) are connected to a current amplifier (130) and wherein the current amplifier has an output for a current measurement signal connected to the controller (ch2).

Regarding Claim 24, Freeman et al. disclose, providing a current sensing device (130) connected in series with the cells for measuring the current through the load, measuring the voltage across the current sensing device to determine the current through the Load and thereby generating a current measurement signal, and supplying the current measurement signal to the controller (ch2).

Regarding Claim 25, Freeman et al. disclose, converting the current measurement signal to a digital current measurement signal, and supplying the digital current measurement signal to the controller (Column 4, lines 57-67).

Response to Arguments

7. Applicant's arguments filed 10/11/2005 have been fully considered but they are not persuasive.

Regarding Claims 1 and 17, Freeman et al. teach that control system can function as a controller of fuel cell parameters such as temperature, humidity, and reactant flow rates, within the electrochemical system (Column 6, lines 61-

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65).

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel Berhanu whose telephone number is 571-272-8430. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Karl Easthom can be reached on 571-272-1989. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SB



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